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Kakishima et al.

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(54) **IMAGE FORMING APPARATUS**

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G03G 15/00 (2006.01)

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CPC ***G03G 15/2039*** (2013.01); ***G03G 15/2003*** (2013.01); *G03G 15/20* (2013.01); *G03G 15/6585* (2013.01)

(58) **Field of Classification Search**
CPC ... G03G 13/20; G03G 15/20; G03G 15/2003; G03G 15/2014; G03G 15/2064
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2004/0037573 A1* 2/2004 Hirota et al. 399/12
2011/0221807 A1* 9/2011 Yoshida 347/9
2014/0093267 A1* 4/2014 Kubo et al. 399/69

FOREIGN PATENT DOCUMENTS

JP 2004-029194 A 1/2004
JP 2006-317632 A 11/2006
JP 2006-317633 A 11/2006

* cited by examiner

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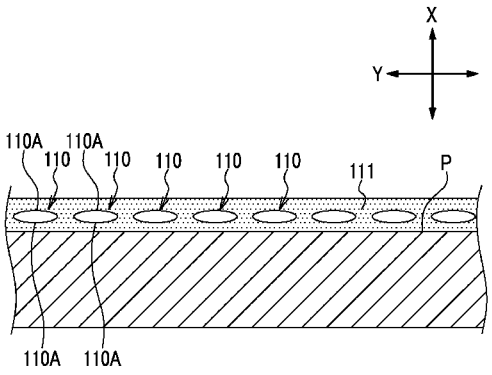
(57) **ABSTRACT**

Provided is an image forming apparatus including a first image unit that uses toner which contains a flat pigment, a second image unit that uses toner which does not contain a flat pigment, and a fixing unit that includes a heating member which contacts with one surface of a recording medium where an image is formed to heat the image and a contact member that contacts with the other surface of the recording medium, and fixes the image to the recording medium, wherein an amount of heat that is applied to the image from the contact member is larger when the image formed by the toner containing the flat pigment is fixed to the recording medium than when the image formed by the toner not containing the flat pigment is fixed to the recording medium.

10 Claims, 12 Drawing Sheets



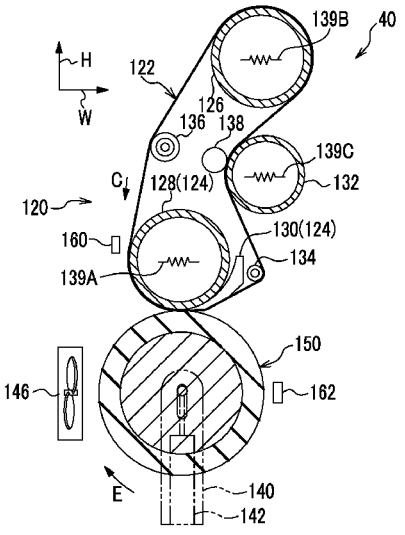


FIG. 1A

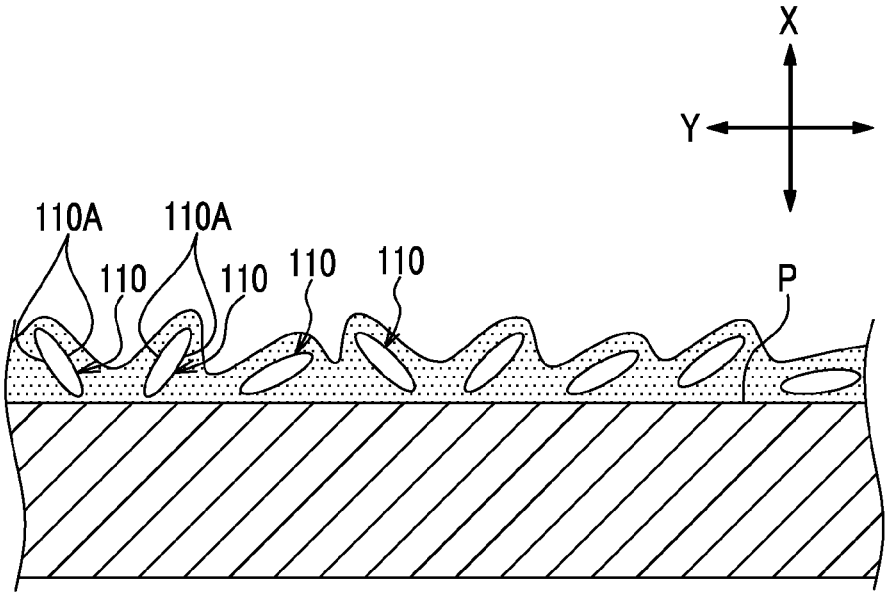
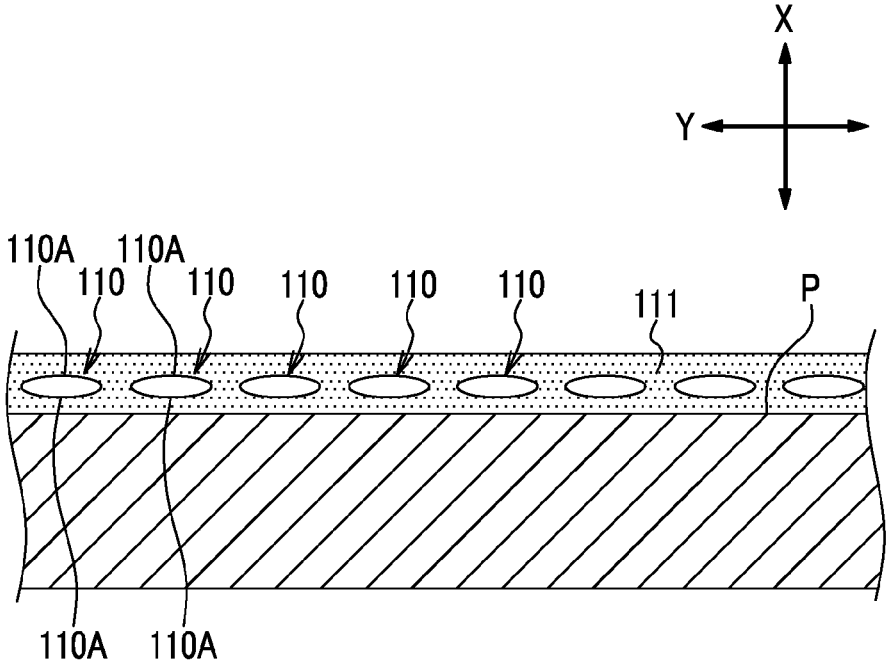

X
Y
110A
110A
110
110
110
110
P

FIG. 1B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110A
110A
110
110
110
110
110
111
P
110A
110A

FIG. 2A

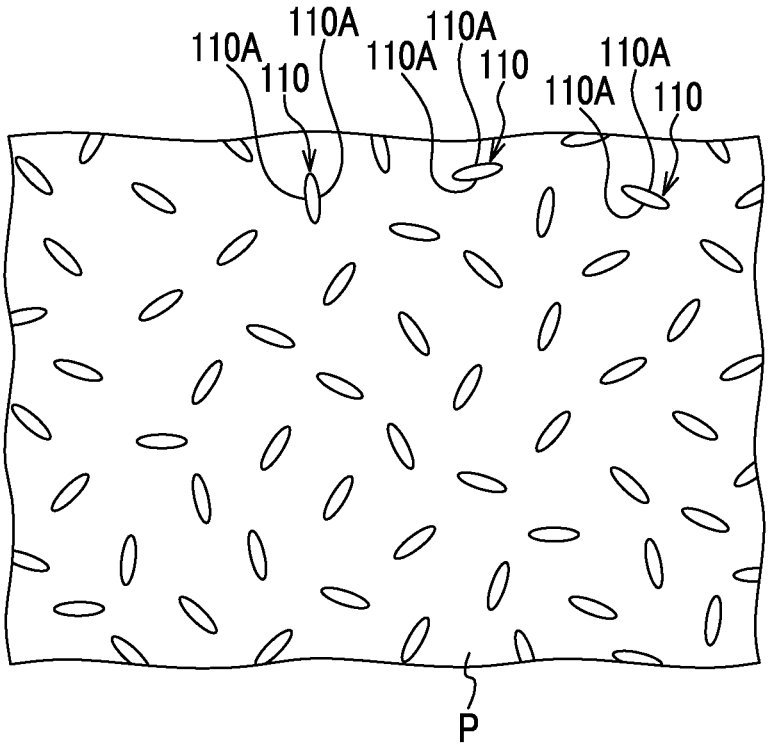


FIG. 2B

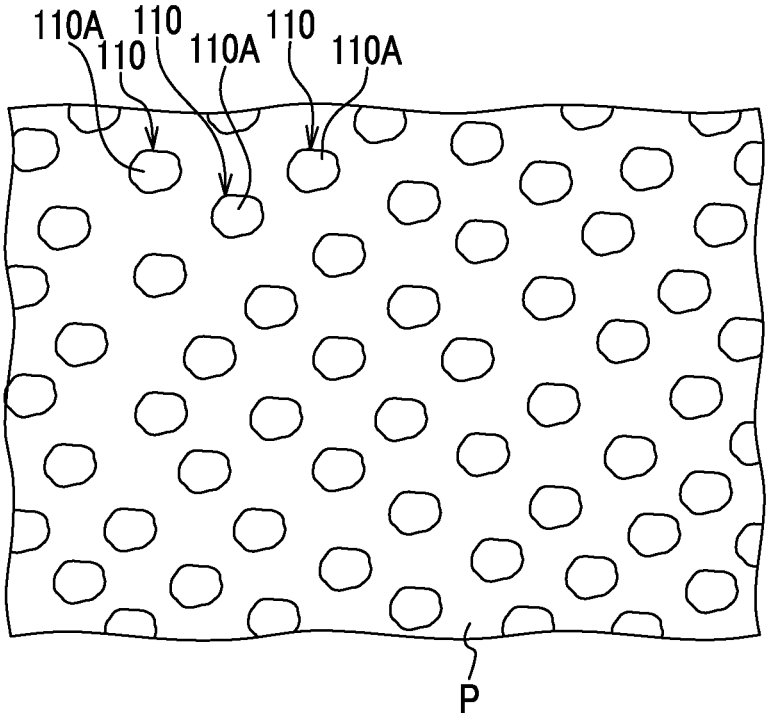


FIG. 3A

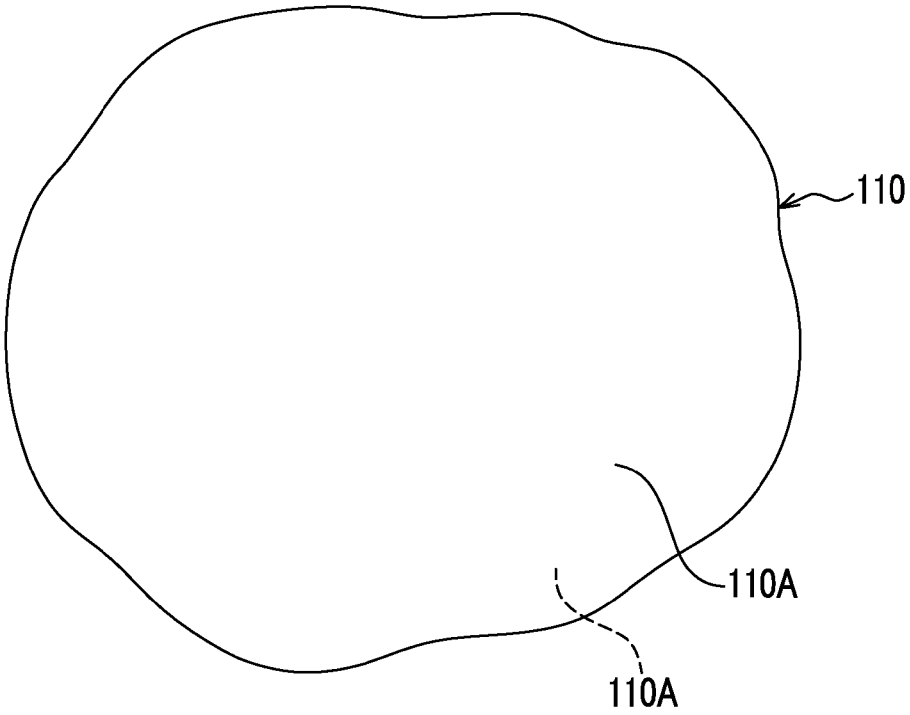


FIG. 3B

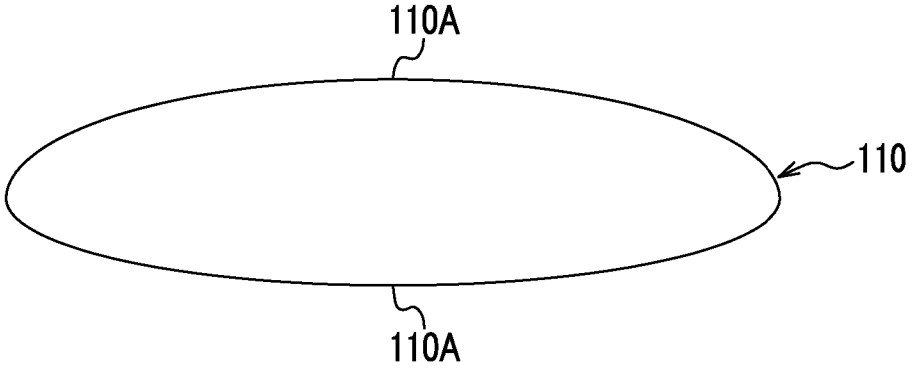


FIG. 4

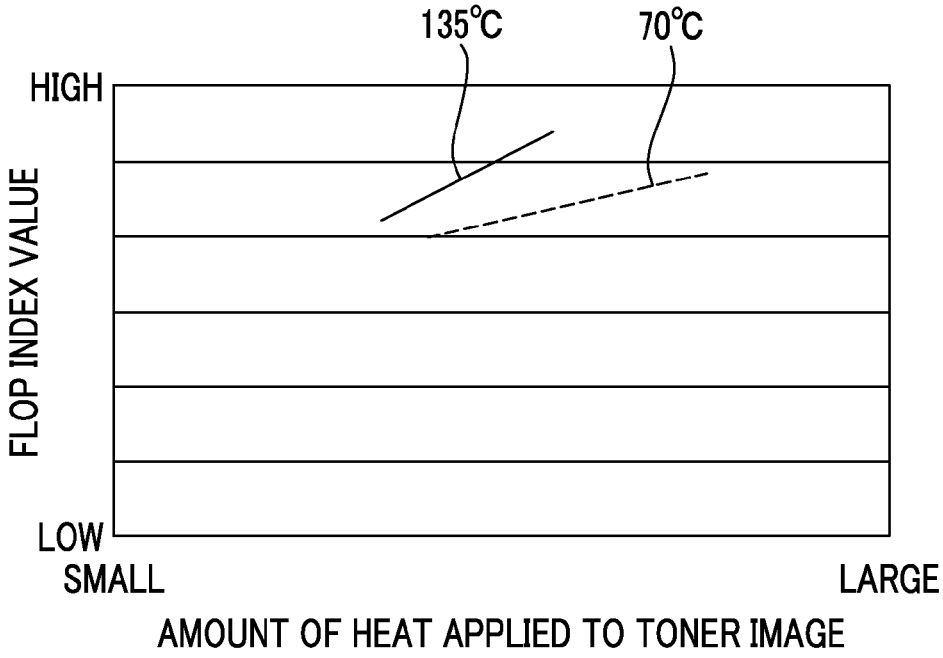

135°C
70°C
HIGH
FLOP INDEX VALUE
LOW
SMALL
LARGE
AMOUNT OF HEAT APPLIED TO TONER IMAGE

FIG. 5A

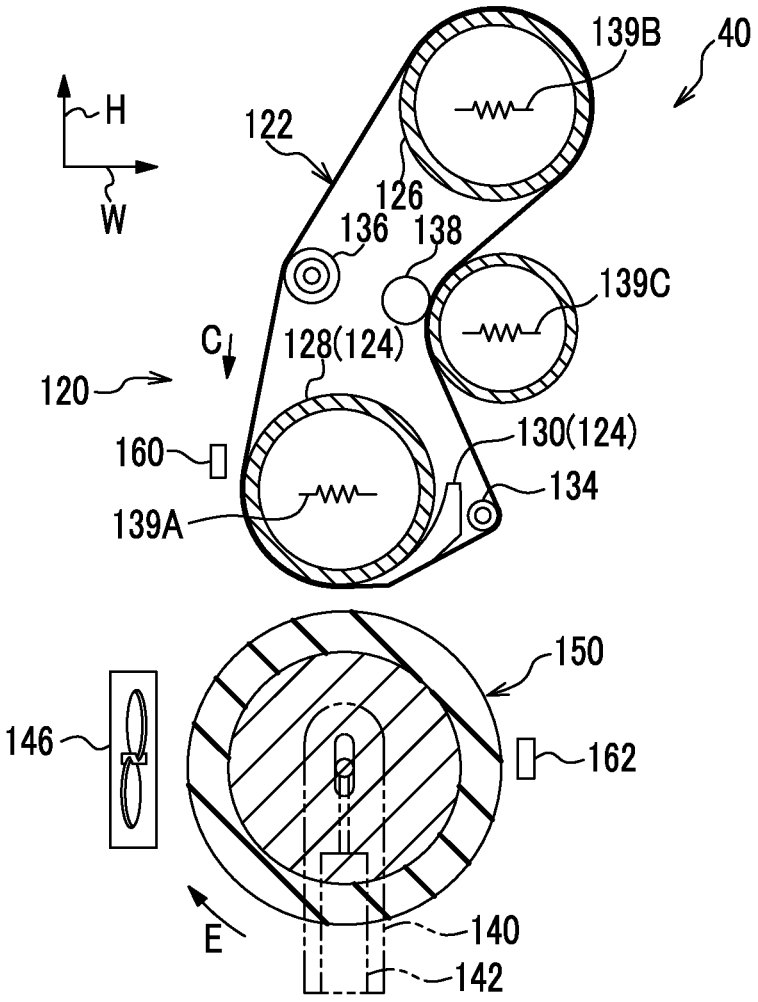
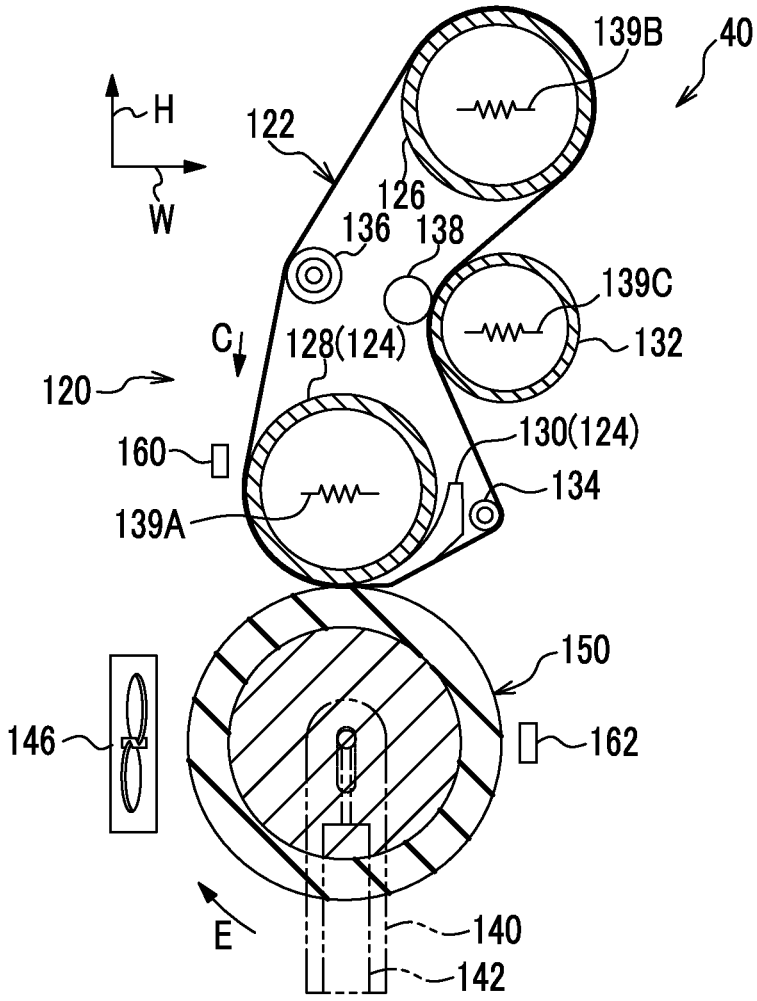

139B
40
H
W
122
126
136
138
139C
C
128(124)
120
160
130(124)
134
139A
150
146
162
E
140
142

FIG. 5B


139B
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H
122
W
126
136
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139C
C
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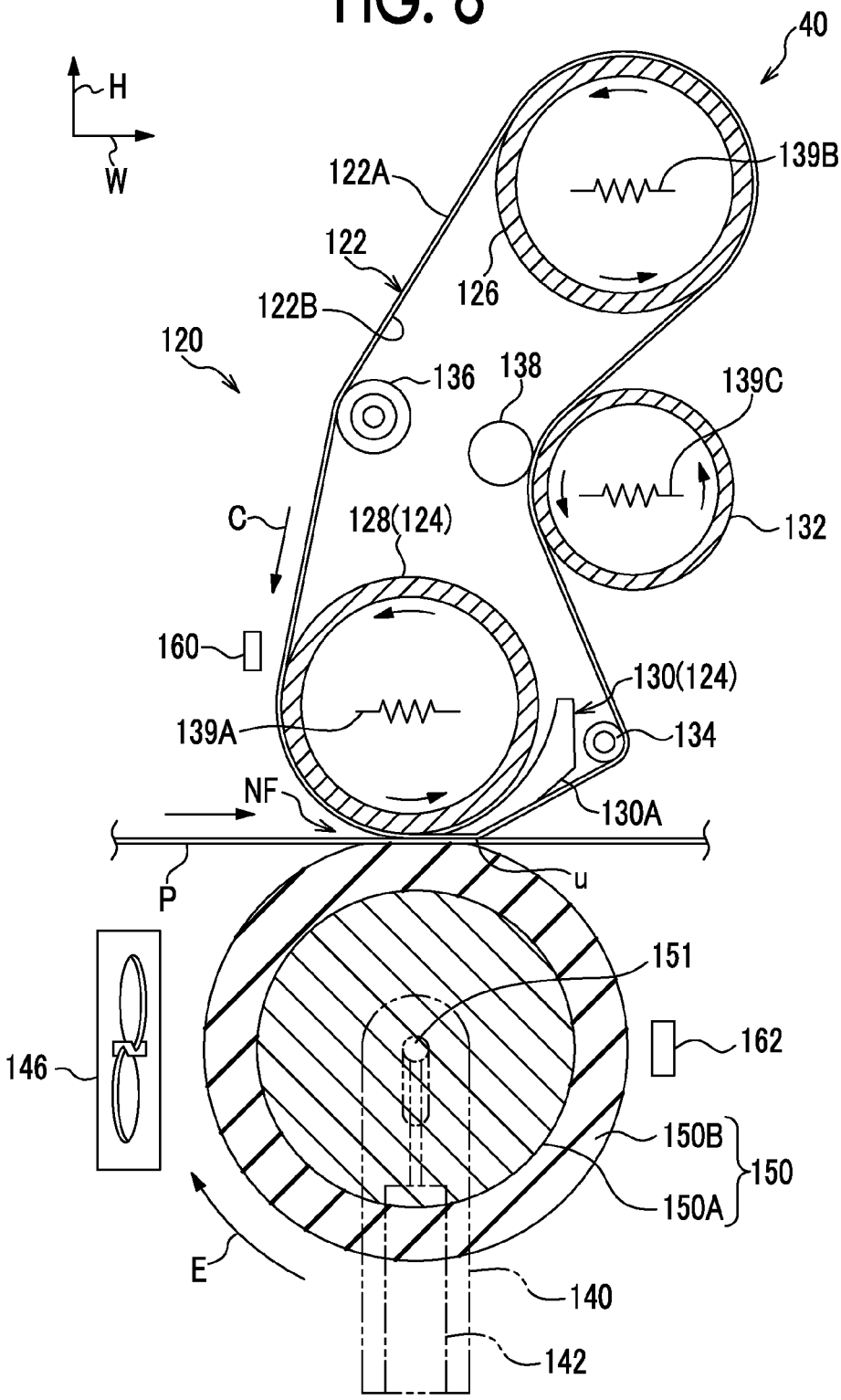
130(124)
134
139A
150
146
162
E
140
142

FIG. 6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H
W
122A
139B
122
126
122B
120
136
138
139C
C
128(124)
132
160
130(124)
139A
134
NF
130A
P
u
151
146
162
150B
150
150A
E
140
142

FIG. 7

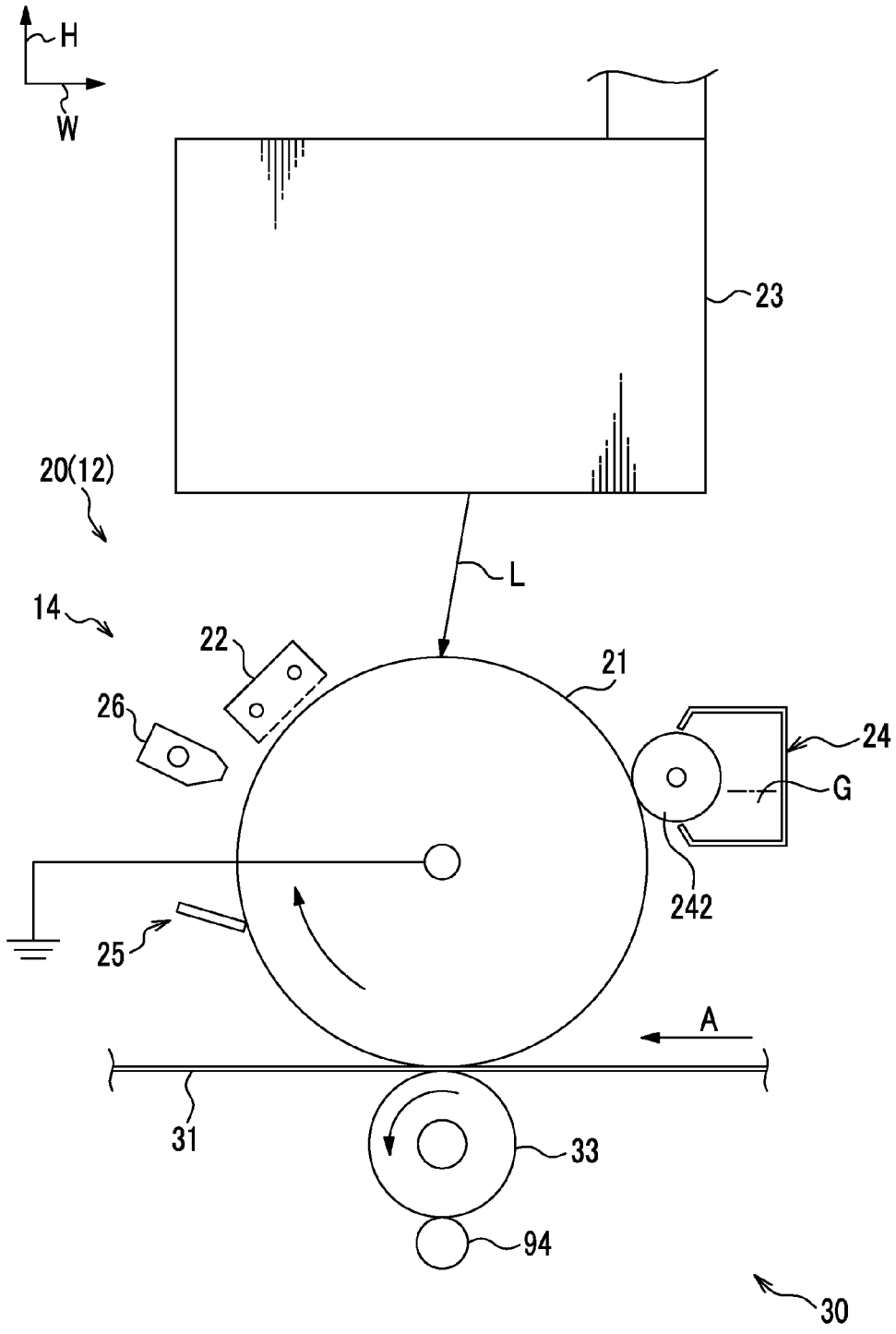
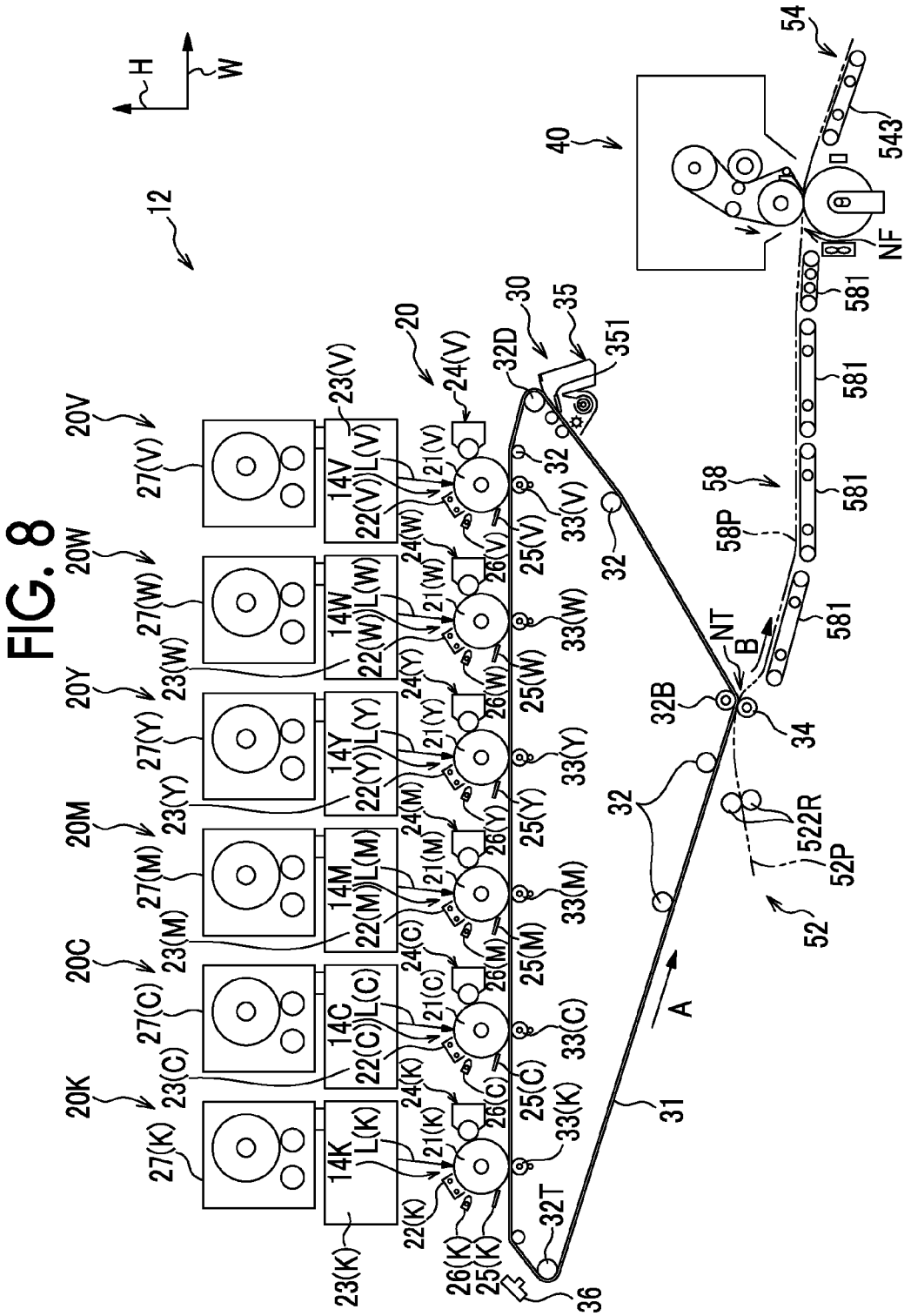


FIG. 8


H
W
12
20
20K
20C
20M
20Y
20W
20V
27(K)
27(C)
27(M)
27(Y)
27(W)
27(V)
23(K)
23(C)
23(M)
23(Y)
23(W)
23(V)
14K
14C
14M
14Y
14W
14V
L(K)
22(C)L(C)
22(M)L(M)
22(Y)L(Y)
22(W)L(W)
22(V)L(V)
21(K)
21(C)
21(M)
21(Y)
21(W)
21(V)
22(K)
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24(C)
24(M)
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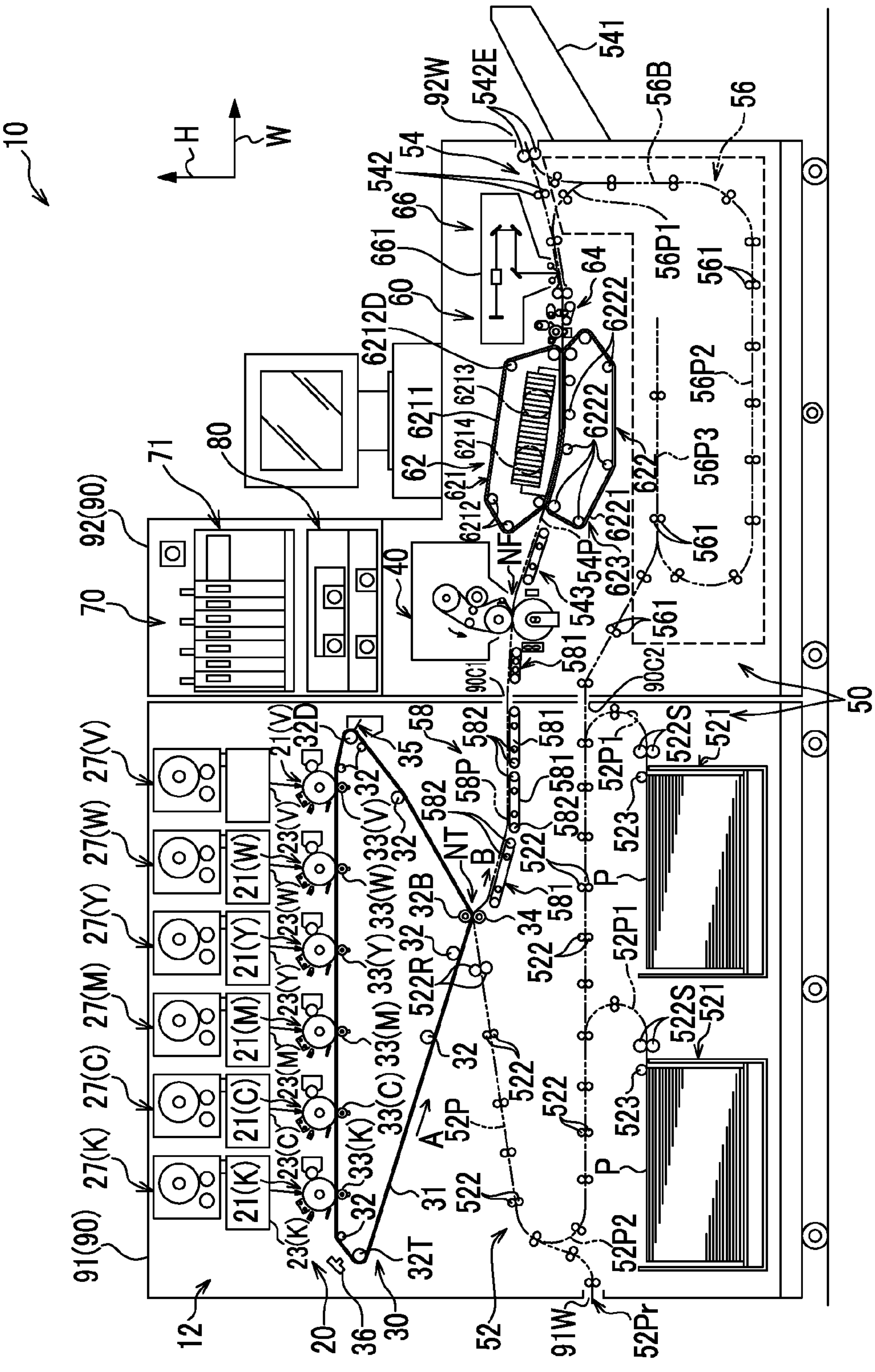
25(V)
33(K)
33(C)
33(M)
33(Y)
33(W)
33(V)
32T
32
32D
30
35
351
36
31
A
32B
34
NT
B
40
54
543
NF
581
58
58P
52
52P
522R

FIG. 9


10
H
W
12
20
36
30
31
52
91W
52Pr
91(90)
92(90)
70
71
80
40
50
54
541
542
542E
543
54P
56
56B
56P1
56P2
56P3
561
58
58P
581
582
60
62
621
6211
6212
6212D
6213
6214
622
6221
6222
623
64
66
661
92W
90C1
90C2
NF
NT
A
B
P
32
32B
32D
32T
33(K)
33(C)
33(M)
33(Y)
33(W)
33(V)
34
35
21(K)
21(C)
21(M)
21(Y)
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21(V)
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23(Y)
23(W)
23(V)
27(K)
27(C)
27(M)
27(Y)
27(W)
27(V)
52P
52P1
52P2
521
522
522R
522S
523

FIG. 10

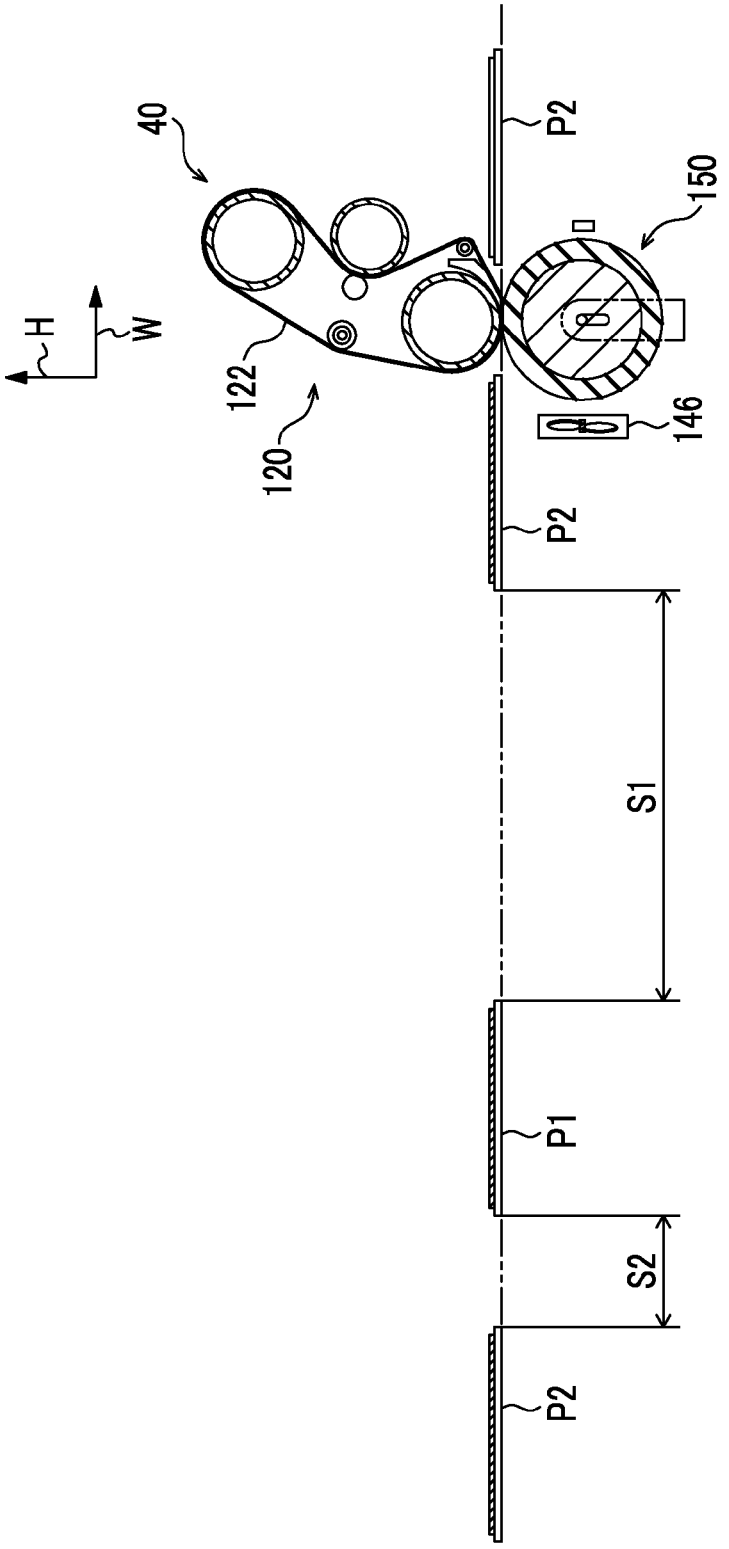

IMAGE FORMING APPARATUS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is based on and claims priority under 35 USC 119 from Japanese Patent Application No. 2013-261535 filed Dec. 18, 2013.

BACKGROUND

Technical Field

The present invention relates to an image forming apparatus.

SUMMARY

According to an aspect of the invention, there is provided an image forming apparatus including:

a first image unit that uses toner which contains a flat pigment;

a second image unit that uses toner which does not contain a flat pigment; and

a fixing unit that includes a heating member which contacts with one surface of a recording medium where an image is formed to heat the image and a contact member that contacts with the other surface of the recording medium, and fixes the image to the recording medium,

wherein an amount of heat that is applied to the image from the contact member is larger when the image formed by the toner containing the flat pigment is fixed to the recording medium than when the image formed by the toner not containing the flat pigment is fixed to the recording medium.

BRIEF DESCRIPTION OF THE DRAWINGS

Exemplary embodiments of the present invention will be described in detail based on the following figures, wherein:

FIGS. **1**A and **1**B are cross-sectional views in which postures of flat pigments that are contained in a toner image which is formed by an image forming apparatus according to a first exemplary embodiment of the invention are illustrated along with a comparative example;

FIGS. **2**A and **2**B are plan views in which the postures of the flat pigments that are contained in the toner image which is formed by the image forming apparatus according to the first exemplary embodiment of the invention are illustrated along with the comparative example;

FIGS. **3**A and **3**B are a plan view and a side view of the flat pigment that is contained in toner which is used in the image forming apparatus according to the first exemplary embodiment of the invention;

FIG. **4** is a graph illustrating a relationship between a flop index value of the toner image that is formed by the image forming apparatus according to the first exemplary embodiment of the invention and an amount of heat that is applied to the toner image;

FIGS. **5**A and **5**B are cross-sectional views illustrating a fixing device that is used in the image forming apparatus according to the first exemplary embodiment of the invention;

FIG. **6** is a cross-sectional view illustrating the fixing device that is used in the image forming apparatus according to the first exemplary embodiment of the invention;

FIG. **7** is a side view illustrating a photoconductor drum of the image forming apparatus according to the first exemplary embodiment of the invention;

FIG. **8** is a configuration diagram illustrating an image forming unit of the image forming apparatus according to the first exemplary embodiment of the invention;

FIG. **9** is a schematic configuration diagram illustrating the image forming apparatus according to the first exemplary embodiment of the invention; and

FIG. **10** is a view illustrating a state where plural sheet members are transported to the fixing device that is used in the image forming apparatus according to a fourth exemplary embodiment of the invention.

DETAILED DESCRIPTION

First Exemplary Embodiment

An example of an image forming apparatus according to an exemplary embodiment of the invention will be described with reference to FIGS. **1**A to **9**. An arrow H in each of the drawings represents an up-down direction of the apparatus, which is a vertical direction. An arrow W in each of the drawings represents a width direction of the apparatus, which is a horizontal direction.

<Overall Configuration of Image Forming Apparatus>

FIG. **9** is a schematic diagram illustrating an overall configuration of an image forming apparatus **10** viewed from a front surface side. As is illustrated in the drawing, the image forming apparatus **10** is configured to include an image forming unit **12** that forms an image on a sheet member P as a recording medium by using electrophotography, a medium transport device **50** that transports the sheet member P, and a post-processing unit **60** that performs post-processing and the like on the sheet member P where the image is formed.

The image forming apparatus **10** is configured to further include a control unit **70** that performs control on each of the above-described units and a power supply unit **80** (described later), and the power supply unit **80** that supplies power to each of the above-described units including the control unit **70**.

In addition, the image forming unit **12** is configured to include a toner image forming unit **20** that forms a toner image, a transfer device **30** that transfers the toner image formed by the toner image forming unit **20** to the sheet member P, and a fixing device **40** that fixes the toner image transferred to the sheet member P on the sheet member P.

The medium transport device **50** is configured to include a medium supply unit **52** that supplies the sheet member P to the image forming unit **12**, and a medium discharge unit **54** that discharges the sheet member P where the toner image is formed. The medium transport device **50** is configured to further include a medium returning unit **56** that is used when the image is formed on both surfaces of the sheet member P, and an intermediate transport unit **58** (described later).

The post-processing unit **60** is configured to include a medium cooling unit **62** that cools the sheet member P to which the toner image is transferred in the image forming unit **12**, a rectification device **64** that rectifies bending of the sheet member P, and an image inspection unit **66** that inspects the image which is formed on the sheet member P. Each of the units that constitute the post-processing unit **60** is arranged in the medium discharge unit **54** of the medium transport device **50**.

Each of the units of the image forming apparatus **10**, except for a discharged medium receiving unit **541** that constitutes the medium discharge unit **54** of the medium transport device

50, is accommodated in a housing 90. The housing 90 according to this exemplary embodiment is a two-piece structure including a first housing 91 and a second housing 92 that are adjacent to each other in the width direction of the apparatus. In this manner, a unit of transport of the image forming apparatus 10 is reduced in the width direction of the apparatus.

Main parts of the image forming unit 12 except for the fixing device 40 (described later) and the medium supply unit 52 are accommodated in the first housing 91. The fixing device 40 that constitutes the image forming unit 12, the medium discharge unit 54 except for the discharged medium receiving unit 541, the medium cooling unit 62, the image inspection unit 66, the medium returning unit 56, the control unit 70, and the power supply unit 80 are accommodated in the second housing 92. The first housing 91 and the second housing 92 are, as an example, coupled with each other by fasteners such as bolts and nuts (not illustrated). In the coupled state, a communication opening portion 90C1 for the sheet member P between a transfer nip NT (described later) of the image forming unit 12 and a fixing nip NF and a connecting path 90C2 for the sheet member P between the medium returning unit 56 and the medium supply unit 52 are formed between the first housing 91 and the second housing 92.

(Image Forming Unit)

As described above, the image forming unit 12 is configured to include the toner image forming unit 20, the transfer device 30, and the fixing device 40. The image forming unit 12 includes plural toner image forming units 20 so as to form the toner image by color. In this exemplary embodiment, the toner image forming units 20 are disposed for a total of six colors, that is, a first custom color (V), a second custom color (W), yellow (Y), magenta (M), cyan (C), and black (K). The (V), (W), (Y), (M), (C), and (K) illustrated in FIG. 9 represent the respective colors described above. The transfer device 30 transfers the toner images of the six colors to the sheet member P at the transfer nip NT from an image transfer belt 31 where the toner images of the six colors are superposed and primary image-transferred (described in detail later).

In this example, the first custom color (V) is, for example, silver, in which the toner containing a flat pigment that adds metallic gloss to the image is used. The second custom color (W) is a corporate color specific to a user, which is more frequently used than other colors. The silver toner and the control of each of the units by the control unit 70 performed when the image is formed by using the silver toner will be described later.

<<Toner Image Forming Unit>>

Basically, the toner image forming units 20 for the respective colors have the same configuration except for the toner that is used. Accordingly, image forming units 14 for the respective colors will not be particularly distinguished in the following description. The image forming unit 14 of the toner image forming unit 20 is configured to include a photoconductor drum 21 as an example of an image holding member, a charging unit 22, an exposure device 23, a developing device 24 as an example of a developing unit, a cleaning device 25, and an erasing device 26 as illustrated in FIG. 7.

[Photoconductor Drum]

The photoconductor drum 21 is formed into a cylindrical shape and grounded, and is driven to rotate about its own axis by a driver (not illustrated). A photosensitive layer that shows, for example, a negative charge polarity is formed on an outer surface of the photoconductor drum 21. As illustrated in FIG. 9, the photoconductor drums 21 for the respective colors are arranged side by side, in a linear shape, along the width direction of the apparatus when viewed from the front surface.

[Charging Unit]

As illustrated in FIG. 7, the charging unit 22 charges the outer surface of the photoconductor drum 21 (photosensitive layer) with a negative polarity. In this exemplary embodiment, the charging unit 22 is a corona discharge type (non-contact charge type) scoroton charging unit.

[Exposure Device]

The exposure device 23 forms an electrostatic latent image on the outer surface of the photoconductor drum 21. Specifically, the exposure device 23 irradiates the outer surface of the photoconductor drum 21 charged by the charging unit 22 with a modulated exposure light beam L according to image data received from an image signal processing unit 71 (refer to FIG. 9) that constitutes the control unit 70. The electrostatic latent image is formed on the outer surface of the photoconductor drum 21 through the irradiation with the exposure light beam L by the exposure device 23.

[Developing Device]

The developing device 24 develops the electrostatic latent image formed on the outer surface of the photoconductor drum 21 with a developer G that contains the toner, and forms the toner image on the outer surface of the photoconductor drum 21.

The toner is supplied to the developing device 24 from a toner cartridge 27 that holds the toner.

[Cleaning Device]

The cleaning device 25 has a blade shape, and scrapes the residual toner on the outer surface of the photoconductor drum 21 from the outer surface of the photoconductor drum 21 after the transfer of the toner image to the transfer device 30.

[Erasing Device]

The erasing device 26 performs charge removal by irradiating the photoconductor drum 21 after the transfer with light. In this manner, charge history of the outer surface of the photoconductor drum 21 is cancelled.

<<Transfer Device>>

The transfer device 30 superposes the toner images of the photoconductor drums 21 for the respective colors on the image transfer belt 31 for the primary image transfer, and secondary image-transfers the superposed toner images to the sheet member P. This will be described in detail later.

[Image Transfer Belt]

As illustrated in FIG. 8, the image transfer belt 31 has an endless shape, and a posture thereof is determined with the image transfer belt 31 being wound around plural rollers 32. In this exemplary embodiment, the image transfer belt 31 has a reverse obtuse angle triangular-shape posture and is long in the width direction of the apparatus when viewed from the front surface. Of the plural rollers 32, a roller 32D illustrated in FIG. 8 functions as a driving roller that allows the image transfer belt 31 to revolve in an arrow A direction by driving of a motor (not illustrated).

Of the plural rollers 32, a roller 32T illustrated in FIG. 8 functions as a tensile strength applying roller that applies tensile strength to the image transfer belt 31. Of the plural rollers 32, a roller 32B illustrated in FIG. 8 functions as a roller facing a secondary image transfer roller (described later). A lower end side apex of the image transfer belt 31, having the reverse obtuse angle triangular-shaped posture as described above, which forms an obtuse angle is wound around the roller 32B. The image transfer belt 31 contacts, from below, with the photoconductor drums 21 for the respec-

tive colors in an upper side portion that extends in the width direction of the apparatus in the posture described above.

[Primary Image Transfer Roller]

Primary image transfer rollers **33** as an example of transfer members are arranged on an inner side of the image transfer belt **31** to transfer the toner images of the respective photoconductor drums **21** to the image transfer belt **31**. The respective primary image transfer rollers **33** are arranged to face the photoconductor drums **21** for the corresponding colors across the image transfer belt **31**. In addition, an image-transferring bias voltage having the polarity opposite to a toner polarity is applied to the primary image transfer rollers **33**. The toner image that is formed in the photoconductor drum **21** is transferred to the image transfer belt **31** when the image-transferring bias voltage is applied.

[Secondary Image Transfer Roller]

In addition, the transfer device **30** includes the secondary image transfer roller **34** that transfers the toner images superposed on the image transfer belt **31** to the sheet member P. The secondary image transfer roller **34** is arranged to nip the image transfer belt **31** between the secondary image transfer roller **34** and the roller **32**B, and forms the transfer nip NT between the image transfer belt **31** and the secondary image transfer roller **34**. The sheet member P is supplied, on a timely basis, from the medium supply unit **52** to the transfer nip NT. The image-transferring bias voltage having the polarity opposite to the toner polarity is applied to the secondary image transfer roller **34** by a power supply unit (not illustrated). When the image-transferring bias voltage is applied, the toner image is transferred from the image transfer belt **31** to the sheet member P passing through the transfer nip NT.

[Cleaning Device]

The transfer device **30** further includes a cleaning device **35** that cleans the image transfer belt **31** after the secondary image transfer. The cleaning device **35** is arranged on a downstream side of a part where the secondary image transfer is performed (transfer nip NT) and on an upstream side of a part where the primary image transfer is performed in a revolving direction of the image transfer belt **31**. The cleaning device **35** includes a blade **351** that scrapes the residual toner on an outer surface of the image transfer belt **31** from the outer surface of the image transfer belt **31**.

<<Fixing Device: Overview>>

The fixing device **40** fixes the toner image, by using heat, to the sheet member P to which the toner image is transferred by the transfer device **30**. A detailed configuration of the fixing device **40** and the control of the fixing device **40** by the control unit **70** will be described in detail later.

(Medium Transport Device)

As illustrated in FIG. **9**, the medium transport device **50** is configured to include the medium transport device **50**, the medium supply unit **52**, the medium discharge unit **54**, the medium returning unit **56**, and the intermediate transport unit **58**.

<<Medium Supply Unit>>

The medium supply unit **52** includes an accommodator **521** in which the sheet members P are stacked and accommodated. In this exemplary embodiment, two accommodators **521** are arranged side by side, along the width direction of the apparatus, below the transfer device **30**.

A medium supply path **52**P is formed, from each of the accommodators **521** to the transfer nip NT that is a secondary image transfer position, by plural transport roller pairs **522**, a guide (not illustrated), and the like. The medium supply path **52**P is shaped (has a substantially "S" shape) to rise and reach the transfer nip NT while being folded back in the width direction of the apparatus in two folded portions **52**P**1** and **52**P**2**.

A feed roller **523** that feeds the uppermost sheet member P stacked in the accommodator **521** is arranged on an upper side of each of the accommodators **521**. Of the plural transport roller pairs **522**, a transport roller pair **522**S on the most upstream side in a transport direction of the sheet member P functions as a separating roller that separates the sheet members P, which are fed sheet by sheet in a stacked manner from the accommodator **521** by the feed roller **523**. Of the plural transport roller pairs **522**, a transport roller pair **522**R that is positioned on an immediately upstream side of the transfer nip NT in the transport direction of the sheet member P is operated to match a movement timing of the toner image on the image transfer belt **31** with a transport timing of the sheet member P.

The medium supply unit **52** further includes a preliminary transport path **52**Pr. The preliminary transport path **52**Pr starts from an opening portion **91**W of the first housing **91** on the side opposite to a second housing **92** side, and joins the folded portion **52**P**2** of the medium supply path **52**P. The preliminary transport path **52**Pr is a transport path that is used when the sheet member P, which is fed from an optional recording medium supply device (not illustrated) arranged to be adjacent to the opening portion **91**W side of the first housing **91**, is sent to the image forming unit **12**.

<<Intermediate Transport Unit>>

As illustrated in FIG. **8**, the intermediate transport unit **58** includes plural belt transport members **581** that are arranged between the transfer nip NT of the transfer device **30** and the fixing nip NF of the fixing device **40** and include endless-shaped transport belts which are wound around rollers.

The sheet member P is transported by revolving the transport belts while suctioning air (negative pressure suction) from inner sides of the belt transport members **581** and suctioning the sheet member P to outer surfaces of the transport belts.

<<Medium Discharge Unit>>

As illustrated in FIG. **9**, the medium discharge unit **54** discharges the sheet member P, where the toner image is fixed by the fixing device **40** of the image forming unit **12**, out of the housing **90** from a discharge port **92**W that is formed in an end portion on the side opposite to the first housing **91** side of the second housing **92**.

The medium discharge unit **54** includes the discharged medium receiving unit **541** that receives the sheet member P which is discharged from the discharge port **92**W.

The medium discharge unit **54** includes a medium discharge path **54**P that transports the sheet member P from the fixing device **40** (fixing nip NF) to the discharge port **92**W. The medium discharge path **54**P is formed from a belt transport member **543**, plural roller pairs **542**, a guide (not illustrated), and the like. Of the plural roller pairs **542**, a roller pair **542**E that is arranged on the most downstream side in a discharge direction of the sheet member P functions as a discharge roller that discharges the sheet member P onto the discharged medium receiving unit **541**.

<<Medium Returning Unit>>

The medium returning unit **56** includes plural roller pairs **561**. The plural roller pairs **561** form a reversal path **56**P through which the sheet member P passing through the image inspection unit **66** is sent when it is required for the image to be formed on both surfaces. The reversal path **56**P includes a branch path **56**P**1**, a transport path **56**P**2**, and a reverse path **56**P**3**. The branch path **56**P**1** branches from the medium discharge path **54**P. The transport path **56**P**2** sends the sheet

member P received from the branch path **56**P**1** to the medium supply path **52**P. The reverse path **56**P**3** is disposed in a middle of the transport path **56**P**2**, and turns the sheet member P inside out by folding (switching-transporting) the sheet member P transported through the transport path **56**P**2** into the direction opposite to the transport direction.

(Post-Processing Unit)

The medium cooling unit **62**, the rectification device **64**, and the image inspection unit **66** that constitute the post-processing unit **60** are arranged in this order, from an upstream side of the discharge direction, on the upstream side in the discharge direction of the sheet member P with respect to a branch part of the branch path **56**P**1** on the medium discharge path **54**P of the medium discharge unit **54**.

<<Medium Cooling Unit>>

The medium cooling unit **62** includes a heat absorbing device **621** that absorbs heat of the sheet member P, and a pressing device **622** that presses the sheet member P to the heat absorbing device **621**. The heat absorbing device **621** is arranged on an upper side with respect to the medium discharge path **54**P, and the pressing device **622** is arranged on a lower side with respect to the medium discharge path **54**P.

The heat absorbing device **621** is configured to include an endless-shaped heat absorption belt **6211**, plural rollers **6212** that support the heat absorption belt **6211**, a heatsink **6213** that is arranged in the heat absorption belt **6211**, and a fan **6214** that cools the heatsink **6213**.

An outer circumferential surface of the heat absorption belt **6211** is in contact with the sheet member P to be capable of heat exchange. Of the plural rollers **6212**, a roller **6212**D functions as a driving roller that transmits a driving force to the heat absorption belt **6211**. The heatsink **6213** is in surface contact, in a slidable manner, with an inner circumferential surface of the heat absorption belt **6211** in a range that is determined along the medium discharge path **54**P.

The pressing device **622** includes an endless-shaped pressing belt **6221**, and plural rollers **6222** that support the pressing belt **6221**. The pressing belt **6221** is wound around the plural rollers **6222**. The pressing device **622** transports the sheet member P with the heat absorption belt **6211** while pressing the sheet member P to the heat absorption belt **6211** (heatsink **6213**).

<<Rectification Device>>

The rectification device **64** is disposed on a downstream side of the medium cooling unit **62** in the medium discharge unit **54**. The rectification device **64** rectifies the bending (curling) of the sheet member P that is received from the medium cooling unit **62**.

<<Image Inspection Unit>>

An inline sensor **661** that forms a main part of the image inspection unit **66** is arranged on a downstream side of the rectification device **64** in the medium discharge unit **54**. The inline sensor **661** detects the presence or absence and degree of a toner concentration defect, an image defect, an image position defect, and the like of the fixed toner image based on the light which is reflected from the sheet member P after the sheet member P is irradiated with the light.

<Image Forming Operation (Effect) of Image Forming Apparatus>

Next, an image forming process performed on the sheet member P by the image forming apparatus **10** and a post-processing process will be described in summary.

As illustrated in FIG. **9**, the control unit **70** operates the toner image forming unit **20**, the transfer device **30**, and the fixing device **40** when an image forming command is received. Then, the photoconductor drums **21** of the image forming units **14** for the respective colors and developing rollers **242** of the developing devices **24** rotate as illustrated in FIG. **8**, and the image transfer belt **31** revolves. In addition, a pressurizing roller **42** rotates and a fixing belt **411** revolves. Furthermore, the control unit **70** operates the medium transport device **50** in synchronization with these operations.

In this manner, the photoconductor drums **21** for the respective colors are charged by the charging unit **22** while rotating. The control unit **70** sends image data image-processed by the image signal processing unit to the respective exposure devices **23**. The respective exposure devices **23** emit exposure light beams L according to the image data, and the charged photoconductor drums **21** are exposed. Then, the electrostatic latent image is formed on each of the outer surfaces of the photoconductor drums **21**. The electrostatic latent image formed in each of the photoconductor drums **21** is developed by the developer that is supplied from the developing device **24**. In this manner, the toner images of the corresponding colors, that is, the first custom color (V), the second custom color (W), yellow (Y), magenta (M), cyan (C), and black (K), are formed in the photoconductor drums **21** for the respective colors.

The toner images of the respective colors formed in the photoconductor drums **21** for the respective colors are sequentially transferred to the revolving image transfer belt **31** as the image-transferring bias voltage is applied through the primary image transfer rollers **33** for the respective colors. In this manner, the superposed toner images in which the toner images for the six colors are superposed are formed on the image transfer belt **31**. The superposed toner images are transported to the transfer nip NT since the image transfer belt **31** revolves.

The sheet member P is supplied to the transfer nip NT, as illustrated in FIG. **9**, with the timing matched with the transport of the superposed toner images by the transport roller pair **522**R of the medium supply unit **52**. The toner images superposed from the image transfer belt **31** are transferred to the sheet member P since the image-transferring bias voltage is applied at the transfer nip NT.

The sheet member P to which the toner image is transferred is transported from the transfer nip NT of the transfer device **30** toward the fixing nip NF of the fixing device **40** by the intermediate transport unit **58**. The fixing device **40** applies heat and pressure to the sheet member P passing through the fixing nip NF. In this manner, the toner image that is transferred to the sheet member P is fixed.

The sheet member P that is discharged from the fixing device **40** is subjected to processing by the post-processing unit **60** while being transported by the medium discharge unit **54** toward the discharged medium receiving unit **541** out of the apparatus. The sheet member P that is heated through a fixing process is cooled first by the medium cooling unit **62**. Then, the bending of the sheet member P is rectified by the rectification device **64**. Furthermore, the presence or absence and degree of the toner concentration defect, the image defect, the image position defect, and the like of the toner image that is fixed to the sheet member P are detected by the image inspection unit **66**. Then, the sheet member P is discharged to the medium discharge unit **54**.

When the image is to be formed on a no-image surface of the sheet member P where the image is not formed (when two-sided printing is performed), the control unit **70** switches the transport path of the sheet member P after the passage through the image inspection unit **66** from the medium discharge path **54**P of the medium discharge unit **54** to the branch path **56**P**1** of the medium returning unit **56**. Then, the sheet member P is turned inside out through the reversal path **56**P and sent to the medium supply path **52**P, and the image is

formed (fixed) on the back surface of the sheet member P through the same image forming process as the above-described image forming process performed on the outer surface. The sheet member P is discharged to the discharged medium receiving unit **541** out of the apparatus by the medium discharge unit **54** through the same process as the above-described process following the image forming performed on the outer surface.

<Main Part Configuration>

Next, the silver toner that is used in the first custom color (V), the fixing device **40** (one example of a fixing unit), and the control by the control unit **70** that is performed when the image is formed by using the silver toner will be described.

(Toner)

As illustrated in FIG. **1**B, the silver toner that is used as the first custom color (V) is configured to contain pigments **110** as an example of the flat pigment and a binder resin **111**, and is used when the metallic gloss is applied to the image. The image to which the metallic gloss is applied refers to an image that is formed by using the silver toner and a non-silver toner and an image that is formed by using only the silver toner.

The pigment **110** is formed of aluminum. When the pigment **110** is placed on a flat surface and viewed from a side, the pigment **110** is shaped such that a size in a left-right direction in the drawing is greater than a size in the up-down direction in the drawing as illustrated in FIG. **3**B.

Furthermore, when the pigment **110** illustrated in FIG. **3**B is viewed from above in the drawing, the pigment **110** has a wider shape than when viewed from the side as illustrated in FIG. **3**A. In a state where the pigment **110** is placed on the flat surface (refer to FIG. **3**B), the pigment **110** has a pair of reflecting surfaces **110**A (flat surfaces) directed above or below. In this manner, the pigment **110** has a flat shape.

The non-silver toner (hereinafter, simply referred to as a "toner of another color") used as the second custom color (W), yellow (Y), magenta (M), cyan (C), and black (K) is configured to contain a pigment (for example, an organic pigment and an inorganic pigment) that does not contain the flat pigment and the binder resin.

(Fixing Device: Detail)

As illustrated in FIG. **6**, the fixing device **40** includes a fixing module **120** as an example of a heating member that includes an endless-shaped fixing belt **122**, and a pressurizing roller **150** as an example of a contact member that pressurizes the fixing module **120**. In addition, the fixing nip NF where the fixing belt **122** and the pressurizing roller **150** contact with each other is formed between the fixing belt **122** and the pressurizing roller **150**.

<<Fixing Module>>

The fixing module **120** includes the above-described fixing belt **122**, a supporting member **124**, and an internal heating roller **126**. The fixing belt **122** fixes the toner image to the sheet member P by heating the toner image while revolving to transport the sheet member P. The supporting member **124** supports the fixing belt **122** by receiving a pressurizing force of the pressurizing roller **150** at a position on an inner side of the fixing belt **122** which corresponds to the fixing nip NF. The internal heating roller **126** is arranged on the side of the inner side of the fixing belt **122** which is opposite to the fixing nip NF, and the fixing belt **122** is wound around the internal heating roller **126**.

Although not illustrated herein, an elastic layer formed of silicone rubber is formed on a polyimide base material, for example, in the fixing belt **122**. Furthermore, a fluorine resin-based release layer is formed on the elastic layer.

The supporting member **124** includes a fixing roller **128** as an example of a rotating member and a peeling pad **130** as an example of a peeling member, and the fixing roller **128** and the peeling pad **130** are arranged in this order from an upstream side of the transport direction of the sheet member P. When torque of a motor (not illustrated) is transmitted to the fixing roller **128**, the fixing roller **128** rotates and the fixing belt **122** revolves in an arrow C direction.

The peeling pad **130** is configured to have an outer side surface **130**A where a corner portion U that bends the fixing belt **122** is formed. When a leading edge of the sheet member P passes through the corner portion U, the leading edge of the sheet member P is peeled off from the fixing belt **122**.

Furthermore, a support roller **134**, a support roller **136**, and a support roller **138** around which the fixing belt **122** is wound are arranged on the inner side of the fixing belt **122**.

The support roller **134** is arranged on a downstream side with respect to the peeling pad **130** in a revolving direction of the fixing belt **122**. Furthermore, the support roller **136** and the support roller **138** are arranged between the fixing roller **128** and the internal heating roller **126** in the vertical up-down direction.

The fixing module **120** further includes an external heating roller **132** that is arranged on an outer circumferential side of the fixing belt **122** to define a revolving path of the fixing belt **122**. The external heating roller **132** is arranged to nip the fixing belt **122** between the support roller **138** and the external heating roller **132**.

Halogen lamps **139**A, **139**B, and **139**C are arranged, as an example of heaters, on inner sides of the fixing roller **128**, the internal heating roller **126**, and the external heating roller **132**. The fixing roller **128** and the internal heating roller **126** are in contact with an inner circumferential surface **122**B of the fixing belt **122** to heat the inner side of the fixing belt **122**, and the external heating roller **132** is in contact with an outer circumferential surface **122**A of the fixing belt **122** to heat the fixing belt **122** from outside.

<<Pressurizing Roller>>

As for the pressurizing roller **150**, an outer circumference of a columnar roller main body **150**A formed of, for example, aluminum is coated with an elastic body layer **150**B formed of silicone rubber. Although not illustrated, a fluorine resin-based peeling layer with a thickness of 100 μm is formed on an outer circumference of the elastic body layer **150**B. When the torque of the motor (not illustrated) is transmitted, the pressurizing roller **150** rotates in an arrow E direction in the drawing at a circumferential speed equal to a circumferential speed of the fixing belt **122**.

<<Others>>

The fixing device **40** includes a pair of supporting members **140** that allow the pressurizing roller **150** and the fixing belt **122** to contact with each other and support the pressurizing roller **150** to be movable to a contact position (refer to FIG. **6**) where the pressurizing roller **150** is pressurized to the fixing belt **122** and a separation position (refer to FIG. **5**A) where the pressurizing roller **150** is separated from the fixing belt **122**. The pair of supporting members **140** are respectively arranged on both sides in a depth direction of the apparatus (page face depth direction) with respect to the pressurizing roller **150**, and support a rotation axis **151** of the pressurizing roller **150** via a bearing (not illustrated).

Furthermore, a pair of cylinders **142** that move the pressurizing roller **150** which is supported by the supporting members **140** to the contact position or the separation position are respectively arranged on both of the sides in the depth direction of the apparatus (page face depth direction) with respect to the pressurizing roller **150**. The cylinders **142** move the rotation axis **151** of the pressurizing roller **150** via the bearing (not illustrated).

The fixing device **40** further includes a fan **146** as an example of a spraying member that blows air to the pressurizing roller **150**.

The fixing device **40** further includes a temperature sensor **160** that detects an outer surface temperature of the fixing belt **122** in a non-contact manner, and a temperature sensor **162** that detects an outer surface temperature of the pressurizing roller **150** in a non-contact manner.

(Control Unit)

When the control unit **70** receives the image forming command to apply the metallic gloss to at least a part of the image, the control unit **70** operates a silver toner image forming unit **20**V (example of a first image unit) along with the toner image forming units **20** for the other colors (examples of second image units).

The other configuration of the control unit **70** will be described with an effect of the main part configuration (described later).

<Effect of Main Part Configuration>

Next, the effect of the main part configuration will be described.

The control unit **70** that receives the image forming command to apply the metallic gloss to at least a part of the image operates the silver toner image forming unit **20**V in the same manner as the toner image forming units **20** for the other colors as illustrated in FIG. **8**.

Specifically, the electrostatic latent image that corresponds to a site where the metallic gloss is applied to the image is formed on an outer surface of a photoconductor drum **21**V. The electrostatic latent image is formed on the entire outer surface of the photoconductor drum **21**V when the metallic gloss is applied to the entire surfaces of the sheet member P. When the metallic gloss is applied to a part thereof, the electrostatic latent image that corresponds to the part is formed.

The electrostatic latent image that is formed on the photoconductor drum **21**V is developed by the developer containing the silver toner which is supplied from a developing device **24**V. In this manner, a silver toner image is formed on the photoconductor drum **21**V.

The silver toner image is transferred to the revolving image transfer belt **31**, and the toner images of the other colors are sequentially transferred to the image transfer belt **31** after the silver toner image is transferred to the image transfer belt **31**. In this manner, the superposed toner images, in which the toner images of the six colors are superposed, are formed on the image transfer belt **31**. The superposed toner images (hereinafter, simply referred to as "toner images") are transferred from the image transfer belt **31** to the sheet member P at the transfer nip NT.

The sheet member P to which the toner images are transferred is transported from the transfer nip NT of the transfer device **30** toward the fixing nip NF of the fixing device **40** by the intermediate transport unit **58**. The fixing device **40** applies heat and pressure to the sheet member P that passes through the fixing nip NF. In this manner, the toner image transferred to the sheet member P is fixed.

Herein, the control unit **70** controls the fixing device **40**, and increases an amount of heat applied from the pressurizing roller **150** to the toner image during the fixing compared to when an image forming command is received not to apply the metallic gloss to the image (when the silver toner is not used).

Hereinafter, an overall control of the fixing device **40** by the control unit **70** will be described, and then a control of the fixing device **40** by the control unit **70** to increase the amount of heat at which the toner image is applied from the pressurizing roller **150** during the fixing will be described.

When the image forming apparatus **10** is off, the pressurizing roller **150** is arranged at the separation position as illustrated in FIG. **5**A. When the image forming apparatus **10** is turned on, the control unit **70** turns on the halogen lamps **139**A, **139**B, and **139**C that are arranged on the inner sides of the fixing roller **128**, the internal heating roller **126**, and the external heating roller **132**. In addition, the control unit **70** controls the motor (not illustrated), rotates the fixing roller **128**, and allows the fixing belt **122** to revolve (rotate) at a predetermined circumferential speed (belt warm-up process).

Furthermore, the control unit **70** controls the motor (not illustrated) to rotate the pressurizing roller **150** at the circumferential speed equal to the circumferential speed of the fixing belt **122**. In addition, the control unit **70** receives information of the temperature sensor **160**. Then, when the fixing belt **122** reaches a predetermined outer surface temperature (for example, 170[° C.]), the control unit **70** controls the cylinders **142** and moves the pressurizing roller **150** from the separation position to the contact position as illustrated in FIGS. **5**A and **5**B. Then, the control unit **70** allows the pressurizing roller **150** to contact with the revolving fixing belt **122**. In this manner, the pressurizing roller **150** is heated (roller heating process).

Then, the control unit **70** receives the information about the outer surface temperature of the pressurizing roller **150** from the temperature sensor **162**. When the outer surface temperature of the pressurizing roller **150** reaches a predetermined temperature, the control unit **70** controls the cylinders **142**, and moves the pressurizing roller **150** from the contact position to the separation position (refer to FIG. **5**A).

Furthermore, the control unit **70** controls the lighting of the halogen lamps **139**A, **139**B, and **139**C, maintains the outer surface temperature of the fixing belt **122** at a predetermined temperature, and controls operation and non-operation of the fan **146** so as to maintain the outer surface temperature of the pressurizing roller **150** at a predetermined temperature (standby state).

Herein, when the control unit **70** receives the image forming command not to apply the metallic gloss to the image (when the silver toner is not used), the control unit **70** maintains the outer surface temperature of the pressurizing roller **150** at, for example, 70 [° C.]. When the control unit **70** receives the image forming command to apply the metallic gloss to the image (when the silver toner is used), the control unit **70** maintains the outer surface temperature of the pressurizing roller **150** at, for example, 135 [° C.]. In other words, when the control unit **70** receives the image forming command to apply the metallic gloss to the image, the control unit **70** increases the outer surface temperature of the pressurizing roller **150** compared to when the control unit **70** receives the image forming command not to apply the metallic gloss to the image. The outer surface temperature of the fixing belt **122** is maintained at the same temperature in both of the cases.

As a result, the outer surface temperature of the pressurizing roller **150** may be changed by moving the pressurizing roller **150** to the contact position during the roller heating process and changing a length of time during which the pressurizing roller **150** and the fixing belt **122** are in contact with each other. Specifically, the length of time during which the pressurizing roller **150** and the fixing belt **122** are in contact with each other during the roller heating process in which the silver toner is used is longer than the length of time during which the pressurizing roller **150** and the fixing belt **122** are in contact with each other during the roller heating process in which the silver toner is not used.

When the toner image is fixed to the sheet member P, the pressurizing roller **150** that is maintained at a predetermined

temperature is moved from the separation position to the contact position as illustrated in FIG. **5**B and the pressurizing roller **150** and the fixing belt **122** are brought into contact with each other (fixable state). Then, the toner image is fixed to the sheet member P by transporting the sheet member P with the sheet member P being nipped between the fixing belt **122** and the pressurizing roller **150**.

As described above, when the control unit **70** receives the image forming command to apply the metallic gloss to the image, the control unit **70** increases the outer surface temperature of the pressurizing roller **150** compared to when the control unit **70** receives the image forming command not to apply the metallic gloss to the image. In this manner, when the control unit **70** receives the image forming command to apply the metallic gloss to the image, the amount of heat that is applied from a pressurizing roller **150** side to the toner image increases compared to when the control unit **70** receives the image forming command not to apply the metallic gloss to the image.

<Evaluation>

Next, a result of an ASTM E2194-based measurement of the flop index value (FI: flop index value) of the image that is formed on the sheet member P by the silver toner will be described with reference to FIG. **4**. The flop index value is an index representing the metallic gloss. The larger the value is, the more the metallic gloss improves.

<<Evaluation Specification>>

1. OS coated paper W (manufactured by Fuji Xerox Inter-Field, basis weight: 127 [g/m^2], smoothness measured based on JISP 8119: 4,735 [Sec]) is used as the sheet member P.

2. Only the silver toner is used as the toner.

3. The outer surface temperature of the pressurizing roller **150** is 70 [° C.] or 135[° C.], and the amount of heat applied to the toner image formed on the sheet member P is changed by changing the outer surface temperature of the fixing belt **122**.

<<Evaluation Result>>

A horizontal axis of a graph in FIG. **4** represents the amount of heat that the fixing device **40** applies to the toner image formed on the sheet member P, and a vertical axis of the graph in FIG. **4** represents the flop index value.

The graph shows a relationship between the amount of heat applied to the toner image, which is changed by changing the outer surface temperature of the fixing belt **122** with the outer surface temperature of the pressurizing roller **150** being at 70 [° C.], and the flop index value. Furthermore, the graph shows a relationship between the amount of heat applied to the toner image, which is changed by changing the outer surface temperature of the fixing belt **122** with the outer surface temperature of the pressurizing roller **150** being at 135 [° C.], and the flop index value.

<<Evaluation Summary>>

It is apparent from the graph that the flop index value is improved by increasing the amount of heat applied to the toner image if the outer surface temperature of the pressurizing roller **150** remains unchanged. In other words, it is apparent that the flop index value is improved by increasing the amount of heat applied to the toner image from a fixing belt **122** side.

Furthermore, it is apparent that the flop index value is improved by increasing the outer surface temperature of the pressurizing roller **150** when the amount of heat applied to the toner image remains unchanged. In other words, the flop index value is improved by increasing the amount of heat applied to the toner image from the pressurizing roller **150** side when the amount of heat applied to the toner image remains unchanged.

In other words, the flop index value is improved by increasing the amount of heat applied to the toner image. During the application of the amount of heat to the toner image, the flop index value is more effectively improved when the amount of heat applied to the toner image from the pressurizing roller **150** side is increased than when the amount of heat applied to the toner image from the fixing belt **122** side is increased.

Hereinafter, a reason for the improvement of the flop index value following the increase in the amount of heat during the fixing of the toner image to the sheet member P will be described.

When the amount of heat is increased during the fixing of the toner image to the sheet member P, a resin binder that constitutes the toner is softened and a movement of the flat-shaped pigments **110** constituting the toner is facilitated in the binder. In this state, the toner image is pressurized toward the fixing belt **122** by the pressurizing roller **150** so that the reflecting surfaces **110**A of the pigments **110** are directed to be orthogonal (X direction in the drawing) to a sheet surface of the sheet member P as illustrated in FIG. **1**B. Furthermore, the pigments **110** line up in a direction (Y direction in the drawing) along the sheet surface of the sheet member P. The pigments **110** whose reflecting surfaces **110**A are directed to be orthogonal to the sheet surface are arranged all over the sheet member P as illustrated in FIG. **2**B.

The pigments **110** whose reflecting surfaces **110**A are directed to be orthogonal to the sheet surface line up in the direction along the sheet surface as illustrated in FIG. **1**B so that diffusion of reflected light reflected from the image is suppressed, as illustrated in FIG. **1**A, compared to when the directions of the reflecting surfaces **110**A of the pigments **110** are not constant. In this manner, the flop index value is improved.

In addition, when the pigments **110** whose reflecting surfaces **110**A are directed to be orthogonal to the sheet surface are arranged all over the sheet member P as illustrated in FIG. **2**B, a concealing ratio, that is, a ratio of the pigments **110** concealing the sheet member P, is improved compared to when the pigments **110** having the reflecting surfaces **110**A whose directions are not constant are arranged on the sheet member Pas illustrated in FIG. **2**A. In other words, a reflective area, where the light that is incident from the outer surface of the sheet member P is reflected by the pigments **110**, increases. The flop index value is improved in this manner as well.

Hereinafter, a reason for the effective improvement of the flop index value that follows the increase in the amount of heat applied to the toner image from the pressurizing roller **150** side when the total amount of heat applied to the image by the fixing device **40** remains unchanged, which is compared to when the amount of heat applied to the toner image from the fixing belt **122** side is increased, will be described.

As illustrated in FIG. **1**B, the binder resin **111** is present also between the sheet member P and the pigments **110**. Since the sheet member P is nipped between the fixing belt **122** and the pressurizing roller **150**, the pigments **110** are pressed to a sheet member P side by the fixing belt **122**. In this case of pressing, the reflecting surfaces **110**A of the pigments **110** are along the sheet surface of the sheet member P as a degree of softening of the binder resin **111** present between the sheet member P and the pigments **110** increases, compared to when the degree of the softening is low.

When the heat is applied from a side (pressurizing roller **150** side) of the sheet member P where the toner image is not formed, the degree of the softening of the binder resin **111** present between the sheet member P and the pigments **110** increases. Accordingly, compared to when the amount of heat

applied to the toner image from the fixing belt **122** side increases, the reflecting surfaces **110**A of the pigments **110** are effectively along the sheet surface of the sheet member P when the amount of heat applied to the toner image from the pressurizing roller **150** side increases. As such, the flop index value is improved.

<Summary of Main Part Configuration>

As described above, when the control unit **70** receives the image forming command to apply the metallic gloss to the image (when the silver toner is used), the control unit **70** controls the fixing device **40** and increases the amount of heat applied to the toner image from the pressurizing roller **150** during the fixing compared to when the control unit **70** receives the image forming command not to apply the metallic gloss to the image (when the silver toner is not used).

As is apparent from the evaluation result described above, the reflecting surfaces **110**A of the pigments **110** have a posture along the sheet surface of the sheet member P when the amount of heat applied to the toner image from the pressurizing roller **150** increases compared to when the amount of heat applied to the toner image from the fixing belt **122** side increases.

In addition, when the reflecting surfaces **110**A of the pigments **110** have the posture along the sheet surface of the sheet member P, the flop index value is improved.

When the amount of heat applied to the image showing the metallic gloss is larger than the amount of heat applied to the image not showing the metallic gloss, the metallic gloss is further felt when original documents of the two images line up.

Second Exemplary Embodiment

Next, an example of an image forming apparatus according to a second exemplary embodiment of the invention will be described. The same reference numerals will be attached to the same members as in the first exemplary embodiment and description thereof will be omitted. Parts different from those of the first exemplary embodiment will be mainly described.

In the image forming apparatus according to the second exemplary embodiment, the length of time during which the pressurizing roller **150** and the fixing belt **122** are in contact with each other when the silver toner is used and the length of time during which the pressurizing roller **150** and the fixing belt **122** are in contact with each other when the silver toner is not used during the roller heating process are equal to each other.

In the image forming apparatus according to the second exemplary embodiment, the outer surface temperature of the pressurizing roller **150** may be changed by changing a rotation speed (circumferential speed) of the fixing belt **122** when the pressurizing roller **150** is brought into contact with the fixing belt **122** and is rotated, during the roller heating process, so as to heat the pressurizing roller **150**.

Specifically, during the roller heating process, a control unit **200** increases the rotational speed of the fixing belt **122** at a time when the silver toner is used to be greater than the rotational speed of the fixing belt **122** at a time when the silver toner is not used. Likewise, the rotational speed of the pressurizing roller is increased.

In other words, an area of the fixing belt **122** where the pressurizing roller **150** is brought into contact with the fixing belt **122** per unit time is increased. In this manner, the outer surface temperature of the pressurizing roller **150** becomes higher when the silver toner is used, compared to when the silver toner is not used. As for the other effects, the second exemplary embodiment is the same as the first exemplary embodiment.

Third Exemplary Embodiment

Next, an example of an image forming apparatus according to a third exemplary embodiment of the invention will be described. The same reference numerals will be attached to the same members as in the first exemplary embodiment and description thereof will be omitted. Parts different from those of the first exemplary embodiment will be mainly described.

In the image forming apparatus according to the third exemplary embodiment, at least one of an operation time of the fan **146** and a spraying amount from the fan **146** (amount of air blown to the pressurizing roller **150**) is controlled in a standby state so that the outer surface temperature of the pressurizing roller **150** becomes higher when the silver toner is used compared to when the silver toner is not used.

Specifically, during the roller heating process, a control unit **210** increases the outer surface temperature of the pressurizing roller **150** to be higher than the outer surface temperature of the pressurizing roller **150** at a time when the silver toner is used. Then, the control unit **210** puts the fixing device **40** into the standby state.

In the standby state, the control unit **210** controls the fan **146** and lowers the outer surface temperature of the pressurizing roller **150** to a predetermined outer surface temperature. When the outer surface temperature of the pressurizing roller **150** is lowered, the control unit **210** puts the fan **146** into non-operation (stops the fan **146**).

Herein, compared to when the silver toner is not used, the control unit **210** performs at least one of the two controls of shortening the operation time of the fan **146** and reducing the spraying amount from the fan **146** when the silver toner is used. In this manner, the outer surface temperature of the pressurizing roller **150** becomes higher when the silver toner is used compared to when the silver toner is not used.

When the outer surface temperature of the pressurizing roller **150** that is arranged at the separation position is higher than a predetermined outer surface temperature due to the heat from the fixing belt **122** side, the control unit **210** operates the fan **146** again, and lowers the outer surface temperature of the pressurizing roller **150** to a predetermined outer surface temperature.

As for the other effects, the third exemplary embodiment is the same as the first exemplary embodiment.

Fourth Exemplary Embodiment

Next, an example of an image forming apparatus according to a fourth exemplary embodiment of the invention will be described with reference to FIG. **10**. The same reference numerals will be attached to the same members as in the first exemplary embodiment and description thereof will be omitted. Parts different from those of the first exemplary embodiment will be mainly described.

In the image forming apparatus according to the fourth exemplary embodiment, a distance from the sheet member P that is transported immediately beforehand is changed when the toner image formed by using the silver toner is fixed to the sheet member P and when the toner image formed without using the silver toner is fixed to the sheet member P. In the following description, the sheet member P to which the toner image formed by using the silver toner is fixed is referred to as a "sheet member P1" and the sheet member P to which the

toner image formed without using the silver toner is fixed is referred to as a "sheet member P2" in some cases.

Specifically, when the toner image is continuously fixed to the sheet member P, a control unit **220** increases the distance (S**1** in FIG. **10**) between the sheet member P1 and the sheet member P which is transported by the fixing device **40** immediately beforehand the sheet member P1 to be longer than the distance (S**2** in FIG. **10**) between the sheet member P2 and the sheet member P which is transported by the fixing device **40** immediately beforehand the sheet member P2. The sheet member P has a constant transport speed.

Herein, to "continuously fix the toner image to the sheet member P" means that the pressurizing roller **150** and the fixing belt **122** are brought into contact with each other to be in the fixable state and the state is maintained so that the toner image is continuously fixed to the plural sheet members P.

In other words, the pressurizing roller **150** and the fixing belt **122** contact with each other between the sheet members P that are continuously transported, and thus the pressurizing roller **150** is heated. In other words, a degree of the heating of the pressurizing roller **150** increases when the distance between the transported sheet members P is long, compared to when the distance is short, and the outer surface temperature of the pressurizing roller **150** increases.

Herein, as described above, the control unit **220** increases the distance (S**1** in FIG. **10**) between the sheet member P1 and the sheet member P which is transported immediately beforehand the sheet member P1 to be longer than the distance (S**2** in FIG. **10**) between the sheet member P2 and the sheet member P which is transported immediately beforehand the sheet member P2. In this manner, the outer surface temperature of the pressurizing roller **150** becomes higher when the silver toner is used compared to when the silver toner is not used.

As for a method for increasing the distance between the sheet members P, the distance between the sheet members P is increased by changing a timing at which the toner image formed by using the silver toner is transferred to the sheet member P. For example, the distance between the sheet members P is increased when a transfer gap at a time when the toner image formed by using the silver toner is transferred to the sheet member P is double a transfer gap at a time when the toner image formed without using the silver toner is transferred to the sheet member P.

As for the other effects, the fourth exemplary embodiment is the same as the first exemplary embodiment.

The certain exemplary embodiments of the invention have been described above in detail, but the invention is not limited to the exemplary embodiments described above and it will be apparent to those skilled in the art that various other exemplary embodiments may be adopted within the scope of the invention. For example, a difference between the amount of heat that is applied to the toner image from the fixing belt **122** side and the amount of heat that is applied to the toner image from the pressurizing roller **150** side may be decreased, although not particularly described in the first exemplary embodiment above, when the toner image that is formed by using the silver toner is fixed to the sheet member P and when the toner image that is formed without using the silver toner is fixed to the sheet member P. Specifically, the difference between the amount of heat that is applied to the toner image from the fixing belt **122** side and the amount of heat that is applied to the toner image from the pressurizing roller **150** side may be decreased by increasing the outer surface temperature of the pressurizing roller **150**.

In addition, although not particularly described in the exemplary embodiments above, the fixing module **120** may, for example, be configured to include only a heating roller whose outer surface is heated, without using the fixing belt **122**, although the fixing module **120** is configured to include the fixing belt **122** in the exemplary embodiments above.

In addition, a member that heats the pressurizing roller **150** may be additionally disposed although the pressurizing roller **150** is heated by the fixing belt **122** in the exemplary embodiments above.

In addition, toner having a metallic color such as a gold color may be used as the toner containing the flat pigment although the toner using the silver toner is used in the exemplary embodiments above. The golden toner is, for example, configured to contain a flat pigment formed of aluminum or the like and a yellow pigment. In other words, the toner containing the flat pigment may contain a pigment other than the flat pigment.

In addition, the pressurizing roller **150** is rotated when the torque of the motor (not illustrated) is transmitted in the exemplary embodiments above. However, even without using a particular motor, the pressurizing roller may be driven and rotated by the fixing belt **122** that revolves when the pressurizing roller **150** and the fixing belt **122** contact with each other.

The foregoing description of the exemplary embodiments of the present invention has been provided for the purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise forms disclosed. Obviously, many modifications and variations will be apparent to practitioners skilled in the art. The embodiments were chosen and described in order to best explain the principles of the invention and its practical applications, thereby enabling others skilled in the art to understand the invention for various embodiments and with the various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the following claims and their equivalents.

What is claimed is:

1. An image forming apparatus comprising:

a first image unit configured to use toner which contains a flat pigment;

a second image unit configured to use toner which does not contain a flat pigment;

a controller; and

a fixing unit that includes:

a heating member configured to contact with one surface of a recording medium where an image is formed to heat the image; and

a contact member configured to contact with the other surface of the recording medium,

wherein the fixing unit is configured to fix the image to the recording medium,

wherein the controller is configured to control an outer surface temperature of the contact member before the fixing unit fixes the image to the recording medium, and

wherein the image forming apparatus is a configured such that an amount of heat that is applied to the image from the contact member is larger when the image formed by the toner containing the flat pigment is fixed to the recording medium than when the image formed by the toner not containing the flat pigment is fixed to the recording medium.

2. An image forming apparatus comprising:

a first image unit configured to use toner which contains a flat pigment;

a second image unit configured to use toner which does not contain a flat pigment; and

a fixing unit that includes:

a heating member configured to contact with one surface of a recording medium where an image is formed and fix the image to the recording medium by heating the image; and

a contact member configured to contact with the other surface of the recording medium,

wherein the image forming apparatus is configured such that a difference between an amount of heat that is applied to the image from the heating member and an amount of heat that is applied to the image from the contact member is smaller when the image formed by the toner containing the flat pigment is fixed to the recording medium than when the image formed by the toner not containing the flat pigment is fixed to the recording medium.

3. The image forming apparatus according to claim **1**, wherein the image forming apparatus is configured such that a length of time during which the heating member and the contact member are in contact with each other so as to heat the contact member is longer when the image formed by the toner containing the flat pigment is fixed to the recording medium than when the image formed by the toner not containing the flat pigment is fixed to the recording medium in a configuration in which the heating member and the contact member are brought into contact with each other, the contact member is heated, and the heated contact member and the heating member are separated from each other, and the heating member and the contact member are brought into contact with each other again when the image is fixed to the recording medium.

4. The image forming apparatus according to claim **2**, wherein the image forming apparatus is configured such that a length of time during which the heating member and the contact member are in contact with each other so as to heat the contact member is longer when the image formed by the toner containing the flat pigment is fixed to the recording medium than when the image formed by the toner not containing the flat pigment is fixed to the recording medium in a configuration in which the heating member and the contact member are brought into contact with each other, the contact member is heated, and the heated contact member and the heating member are separated from each other, and the heating member and the contact member are brought into contact with each other again when the image is fixed to the recording medium.

5. The image forming apparatus according to claim **1**, wherein the image forming apparatus is configured such that a rotational speed of the heating member at a time when the contact member and the heating member are brought into contact with each other so as to heat the contact member and the heating member is rotated is higher when the image formed by the toner containing the flat pigment is fixed to the recording medium than when the image formed by the toner not containing the flat pigment is fixed to the recording medium in a configuration in which the heating member is rotated, the contact member is brought into contact with the heating member and is rotated to heat the contact member, the heated contact member and the heating member are separated from each other, and the heating member and the contact member are brought into contact with each other again when the image is fixed to the recording medium.

6. The image forming apparatus according to claim **2**, wherein the image forming apparatus is configured such that a rotational speed of the heating member at a time when the contact member and the heating member are brought into contact with each other so as to heat the contact member and the heating member is rotated is higher when the image formed by the toner containing the flat pigment is fixed to the recording medium than when the image formed by the toner not containing the flat pigment is fixed to the recording medium in a configuration in which the heating member is rotated, the contact member is brought into contact with the heating member and is rotated to heat the contact member, the heated contact member and the heating member are separated from each other, and the heating member and the contact member are brought into contact with each other again when the image is fixed to the recording medium.

7. The image forming apparatus according to claim **1**, further comprising:

a spraying member configured to blow air to the contact member,

wherein the image forming apparatus is configured such that at least one of an operation time of the spraying member and a spraying amount from the spraying member is controlled, and the amount of heat that is applied to the image from the contact member is larger when the image formed by the toner containing the flat pigment is fixed to the recording medium than when the image formed by the toner not containing the flat pigment is fixed to the recording medium.

8. The image forming apparatus according to claim **2**, further comprising:

a spraying member configured to blow air to the contact member,

wherein the image forming apparatus is configured such that at least one of an operation time of the spraying member and a spraying amount from the spraying member is controlled, and the amount of heat that is applied to the image from the contact member is larger when the image formed by the toner containing the flat pigment is fixed to the recording medium than when the image formed by the toner not containing the flat pigment is fixed to the recording medium.

9. The image forming apparatus according to claim **1**, wherein the image forming apparatus is configured such that a distance between the recording medium and a recording medium transported immediately beforehand when the image is continuously fixed to the recording mediums is longer when the image formed by the toner containing the flat pigment is fixed to the recording medium than when the image formed by the toner not containing the flat pigment is fixed to the recording medium in a configuration in which the fixing unit transports the recording mediums by nipping the recording mediums between the heating member and the contact member.

10. The image forming apparatus according to claim **2**, wherein the image forming apparatus is configured such that a distance between the recording medium and a recording medium transported immediately beforehand when the image is continuously fixed to the recording mediums is longer when the image formed by the toner containing the flat pigment is fixed to the recording medium than when the image formed by the toner not containing the flat pigment is fixed to the recording medium in a configuration in which the fixing unit transports the recording mediums by nipping the recording mediums between the heating member and the contact member.

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